EXHIBIT 1

REDACTED PUBLIC VERSION

NOVARTIS

Technical R&D / Chemical & Analytical Development

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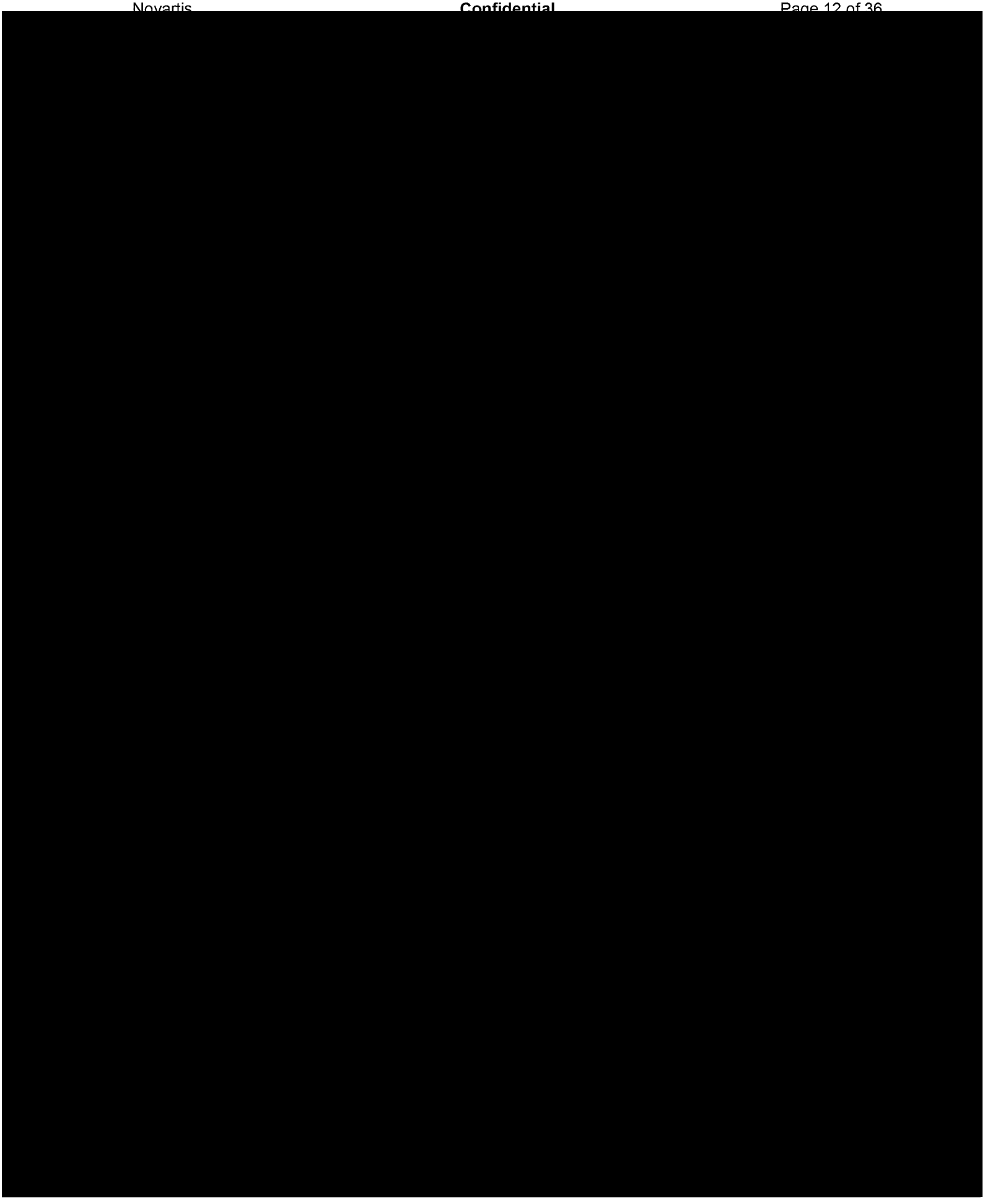

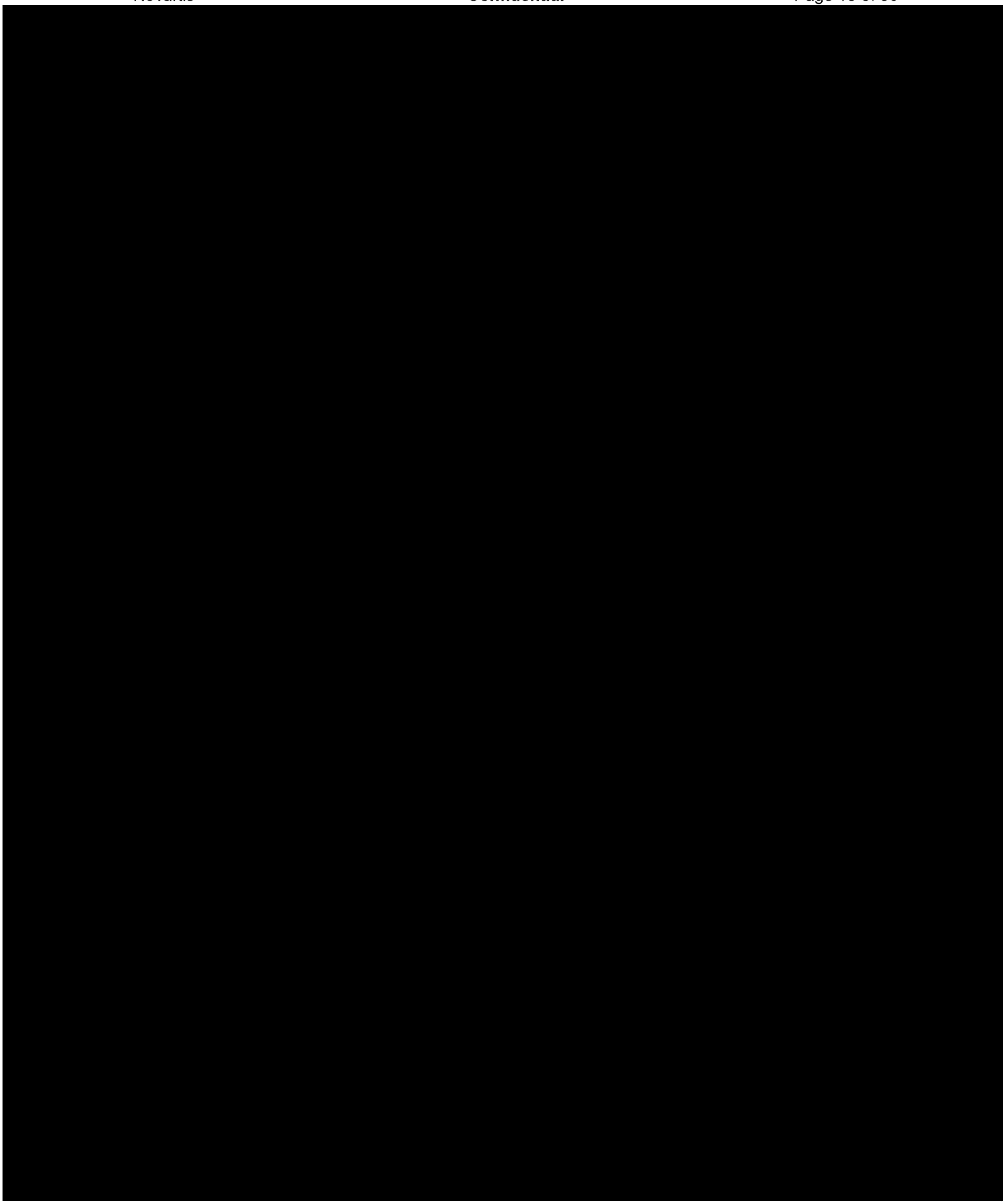

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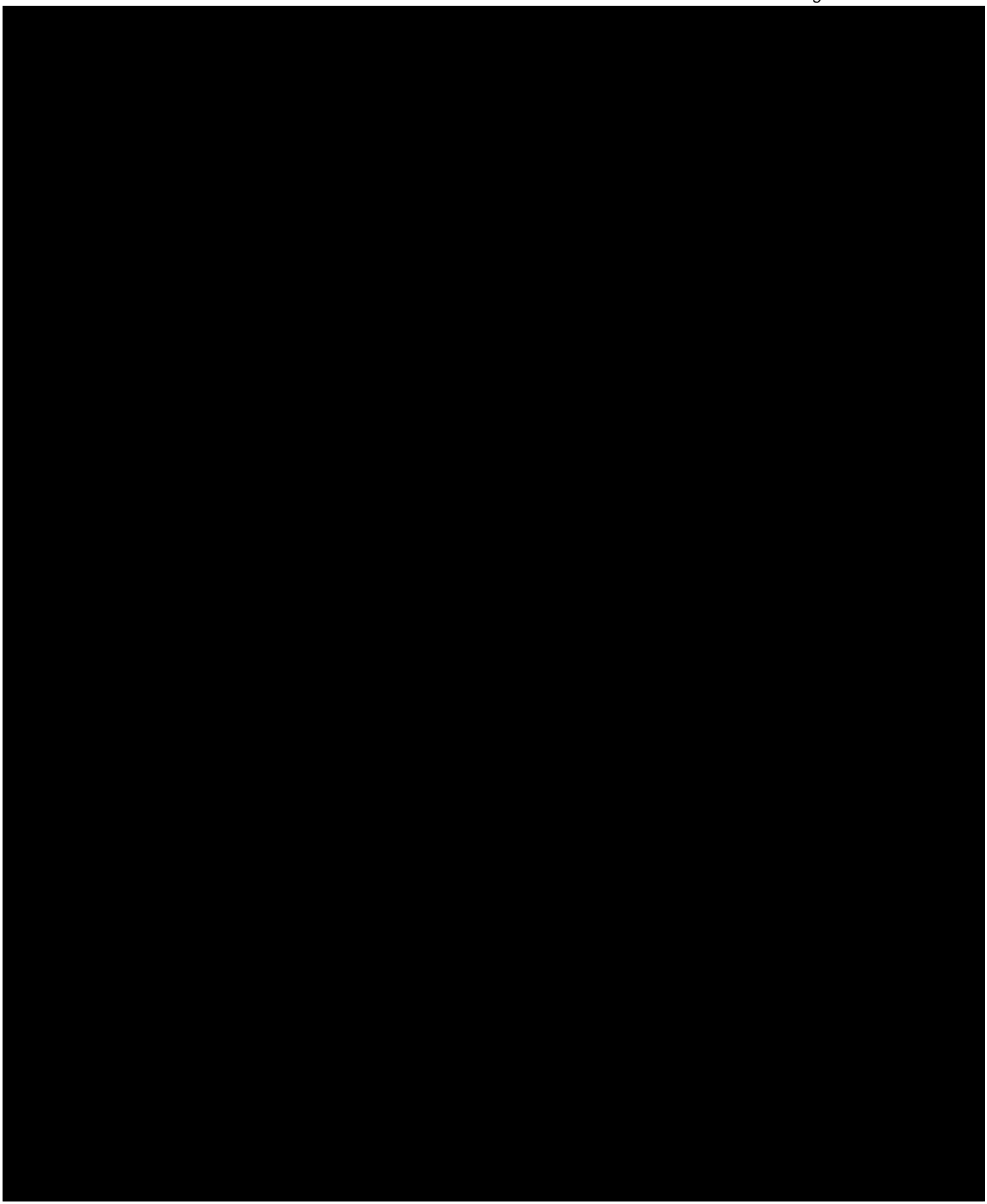

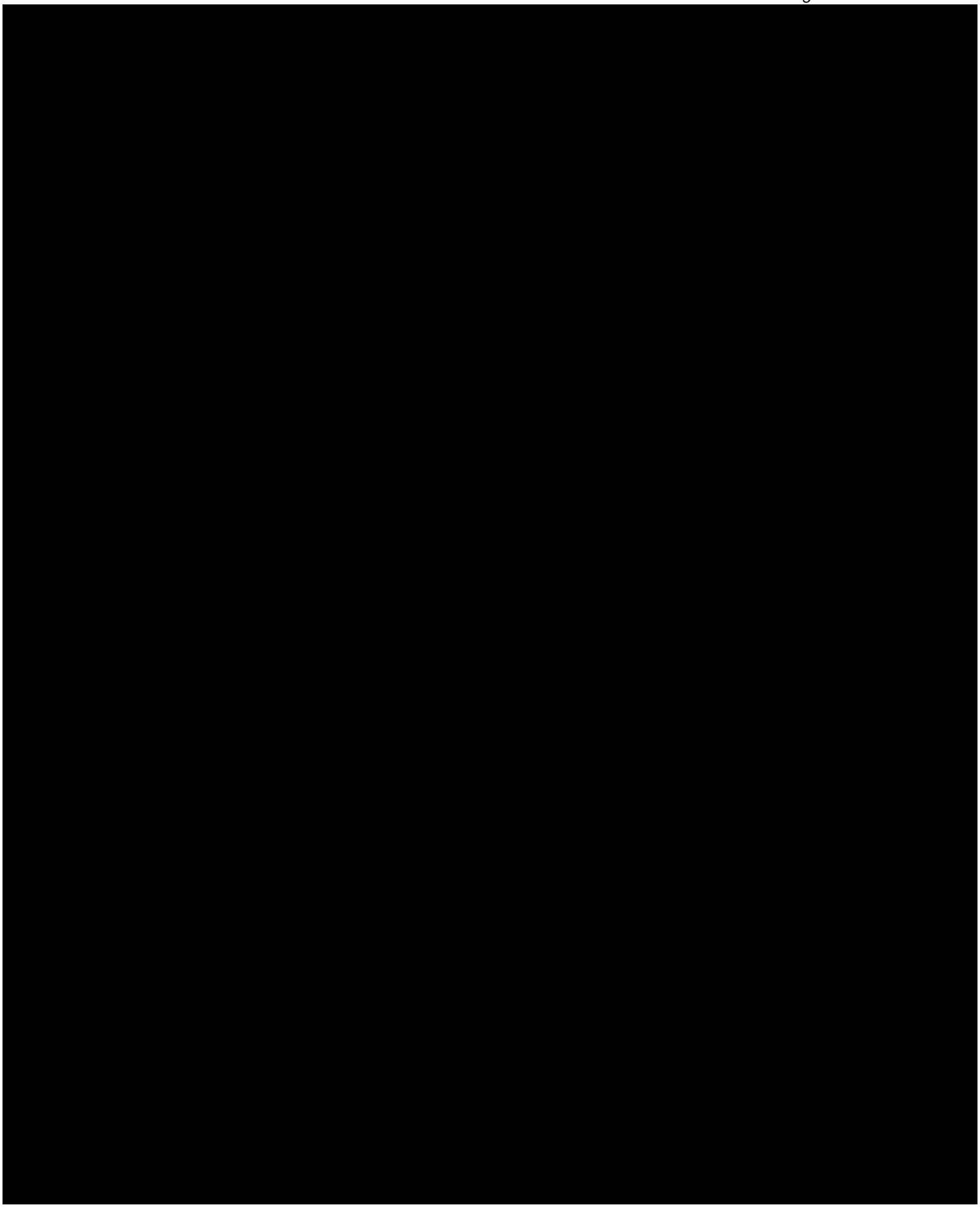

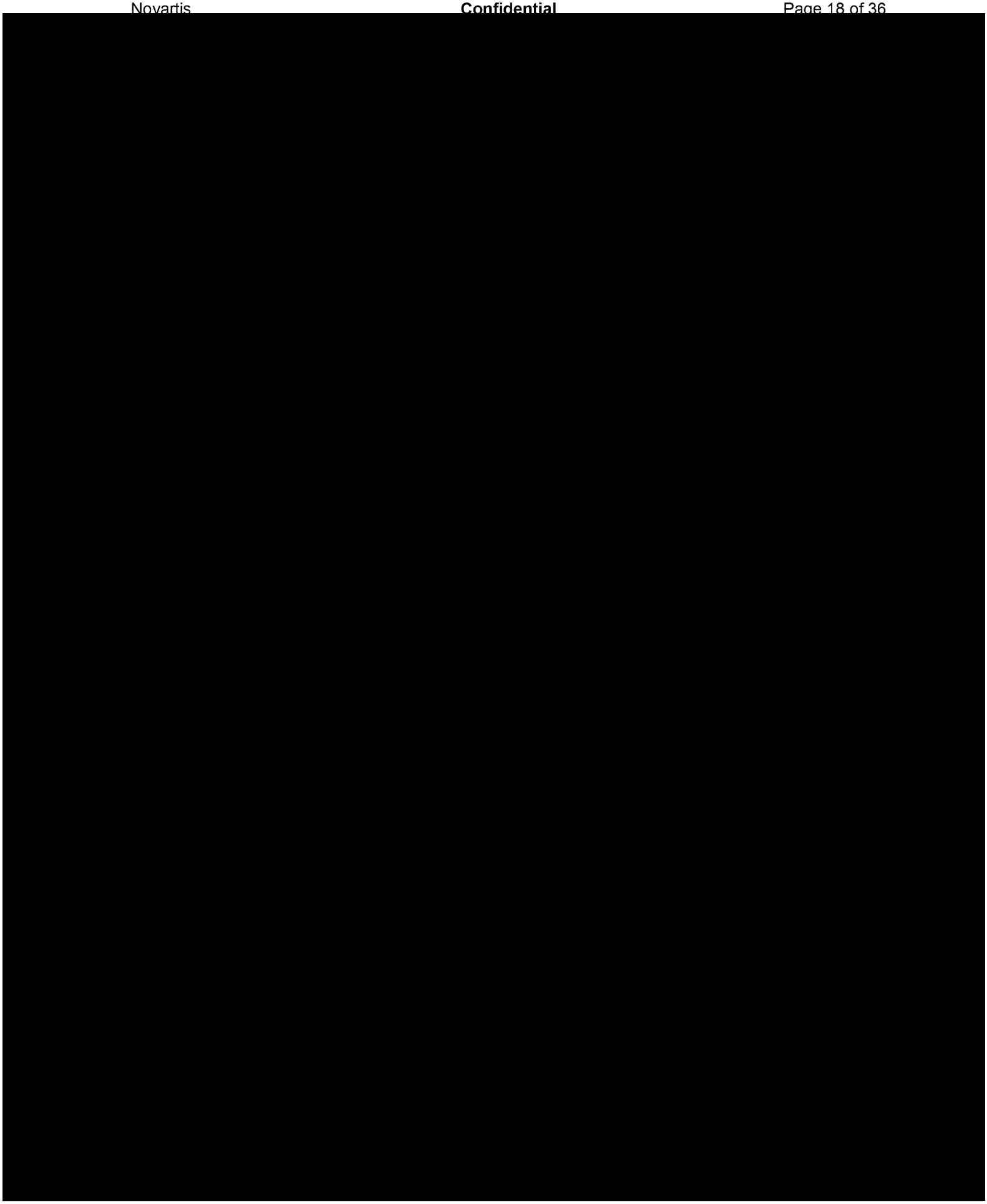

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8.1 Basic crystallographic information

Basic crystallographic information on the LCZ696 dual-active prodrug, obtained from the single crystal structure solution, is summarized in the table below.

Sum formula	$C_{48}H_{55}N_6O_8Na_3 \cdot 2.5H_2O$
Molecular mass	957.99
Crystal color	colorless
Crystal shape	tabular: hexagonal
Crystal system	monoclinic
Space group	$P2_1$
Cell parameters	a=20.344 Å
	b=42.018 Å
	c=20.374 Å
	α = 90°
	β=119.29°
	γ = 90°
Volume of unit cell	15190.03 $Å^3$
Z (the number of asymmetric units in the unit cell)	2

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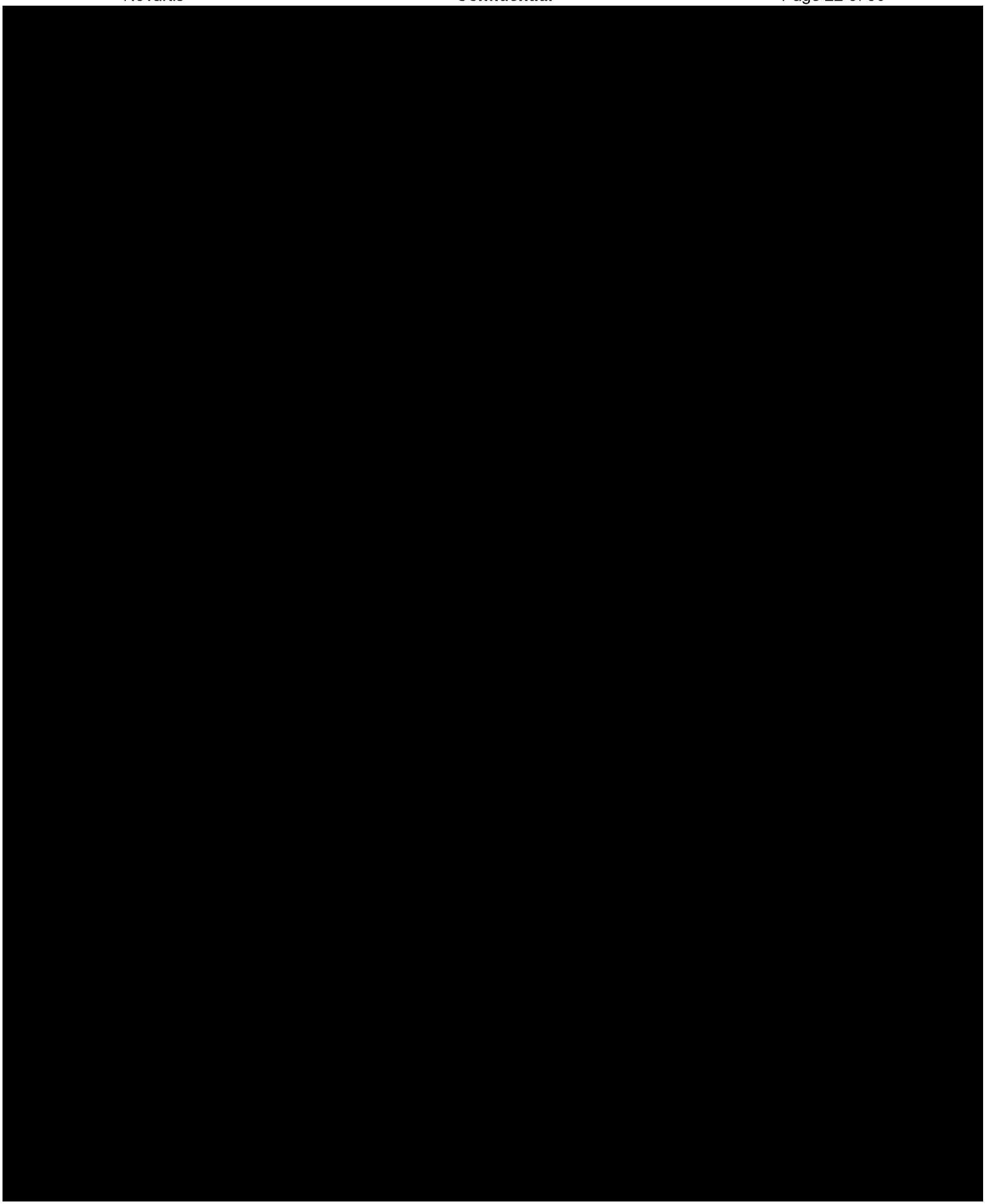

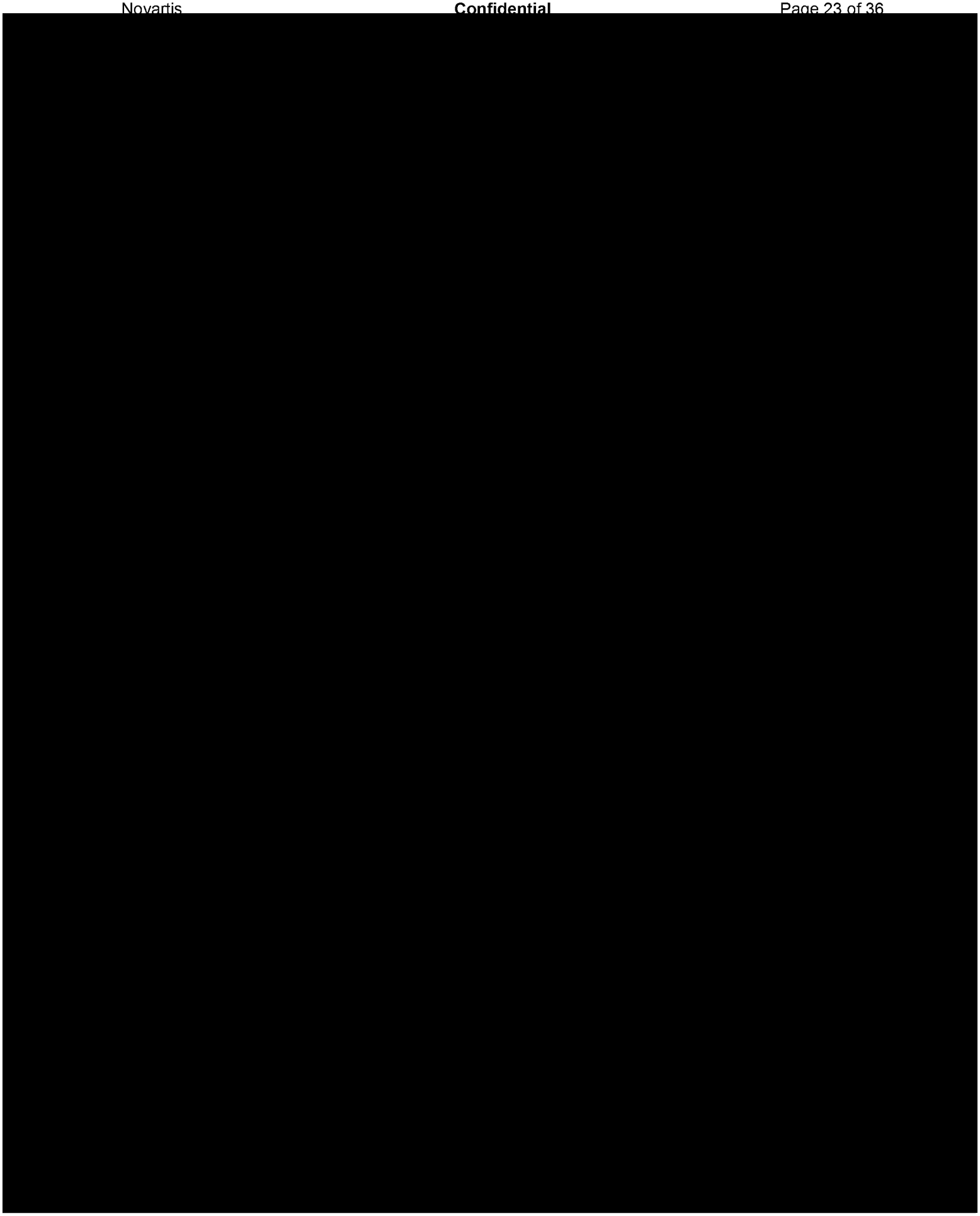

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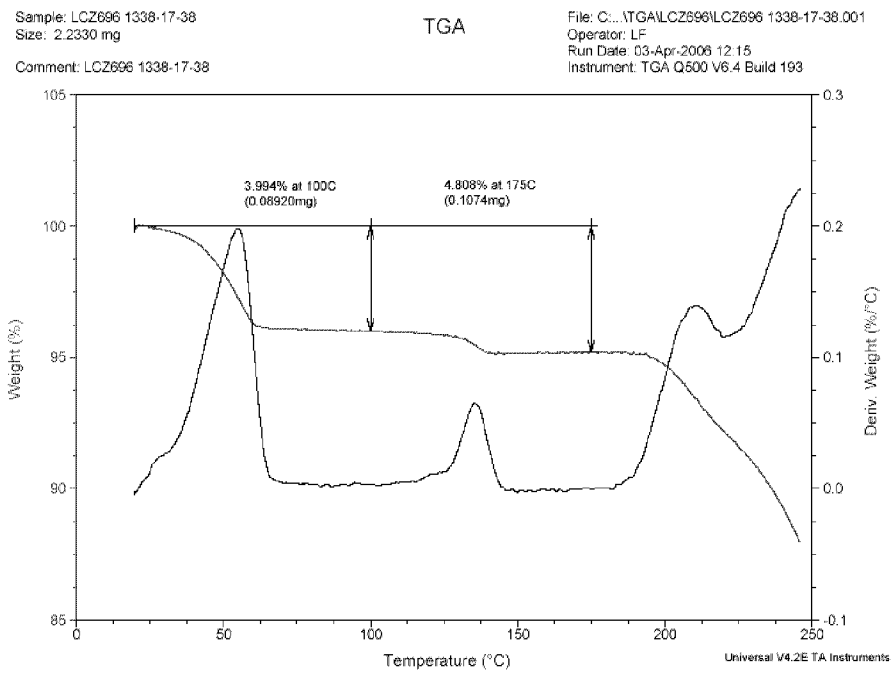
Figure 11-4 Thermogravimetric analysis (TGA) thermogram for LCZ696



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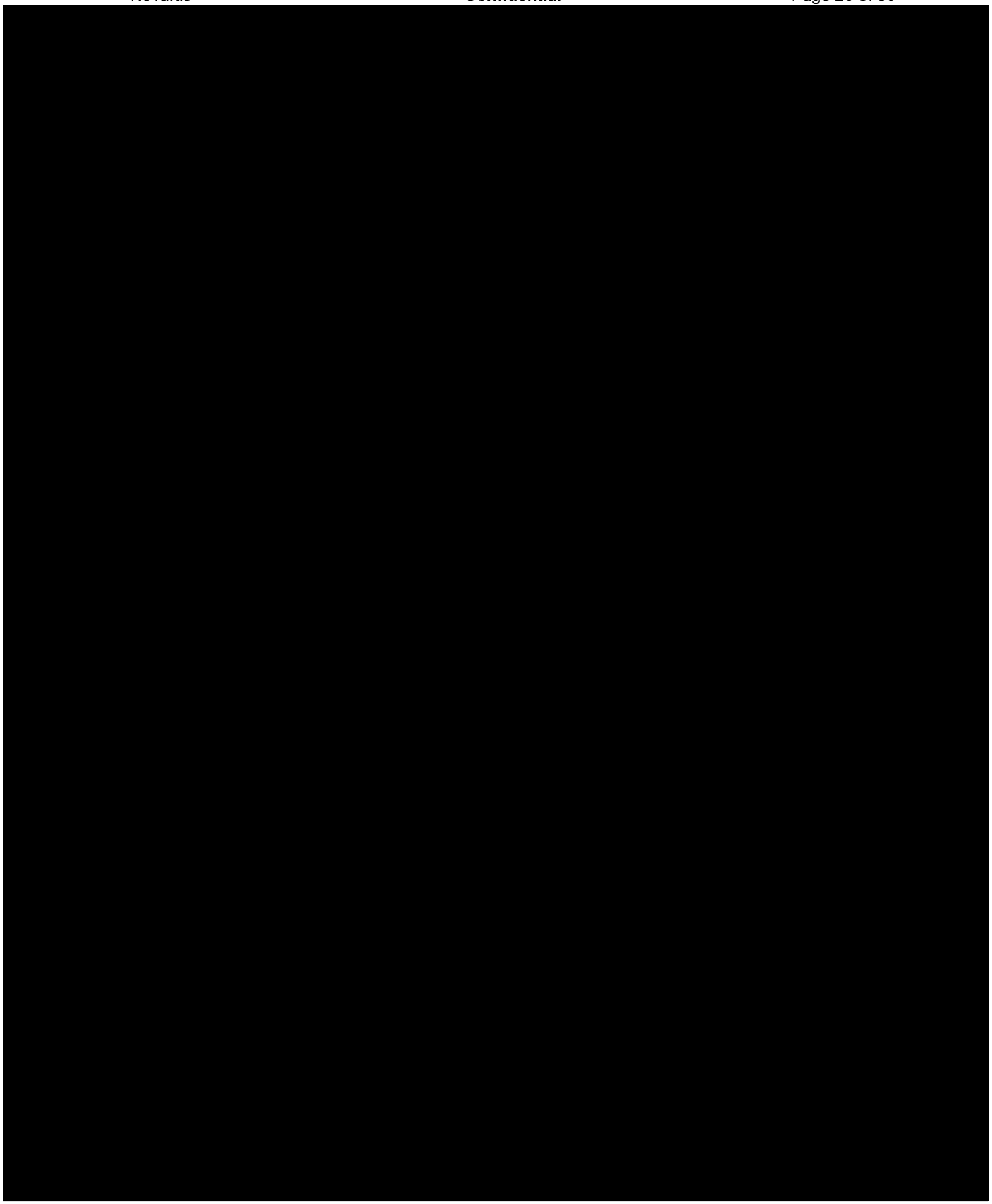
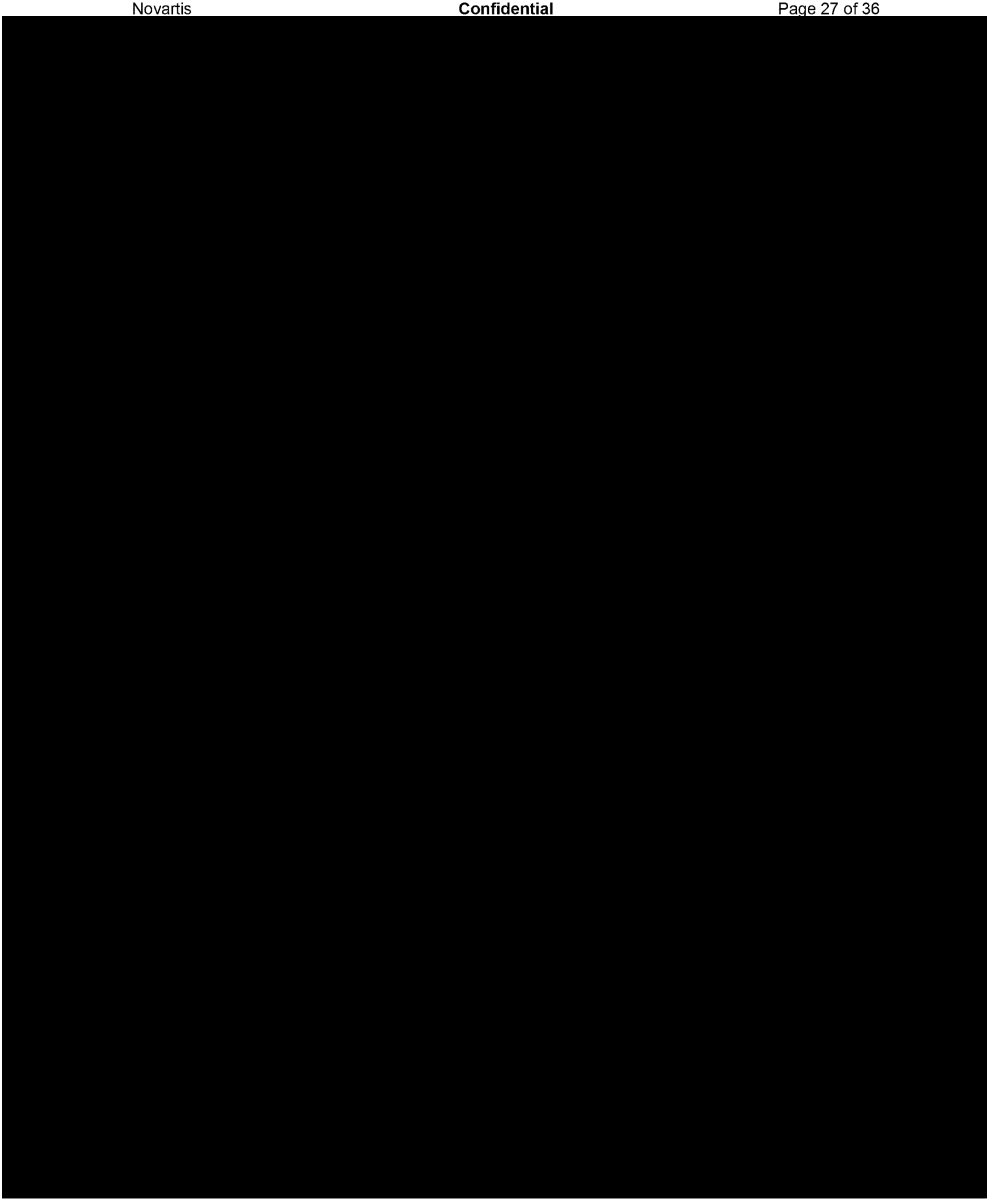




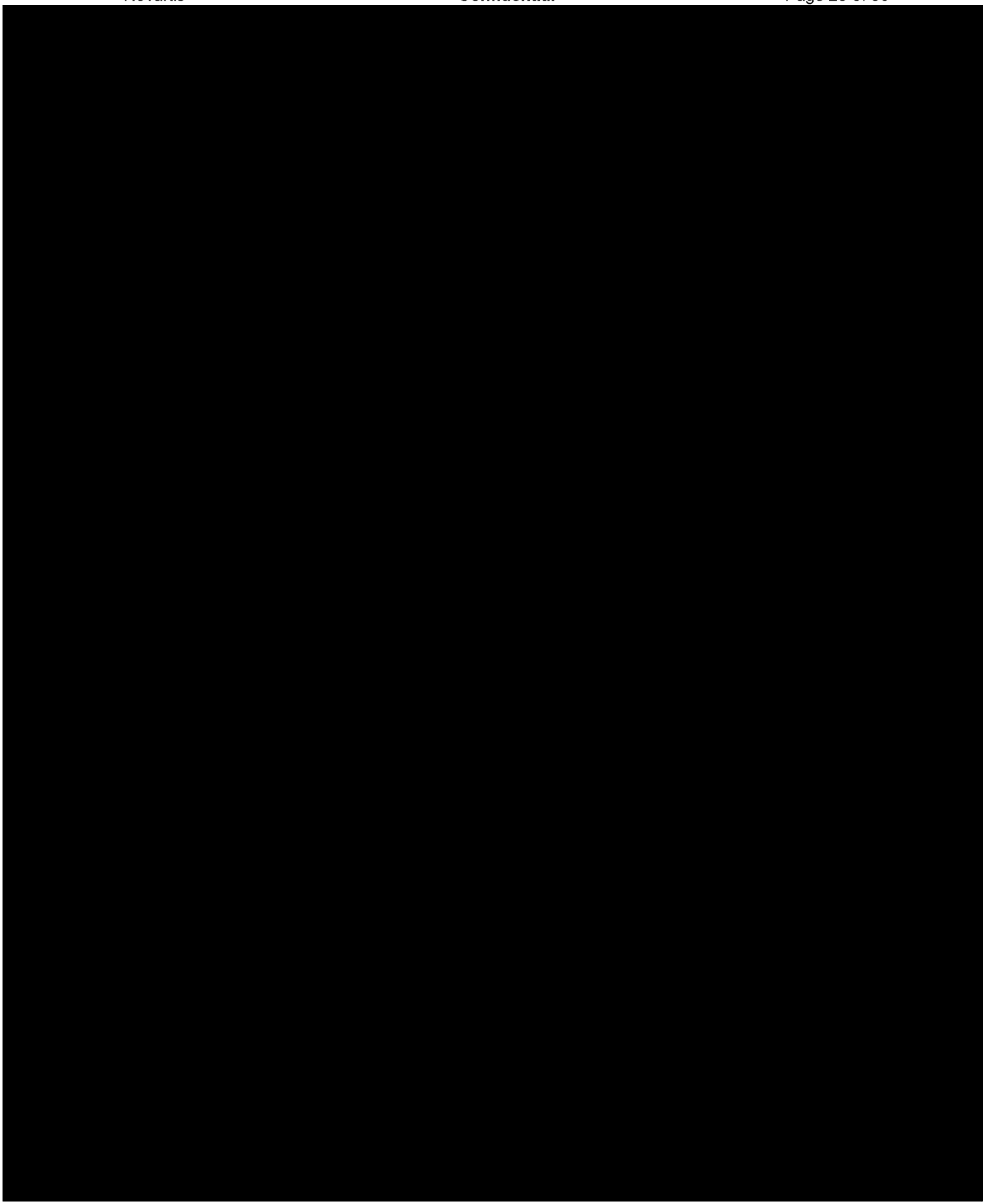
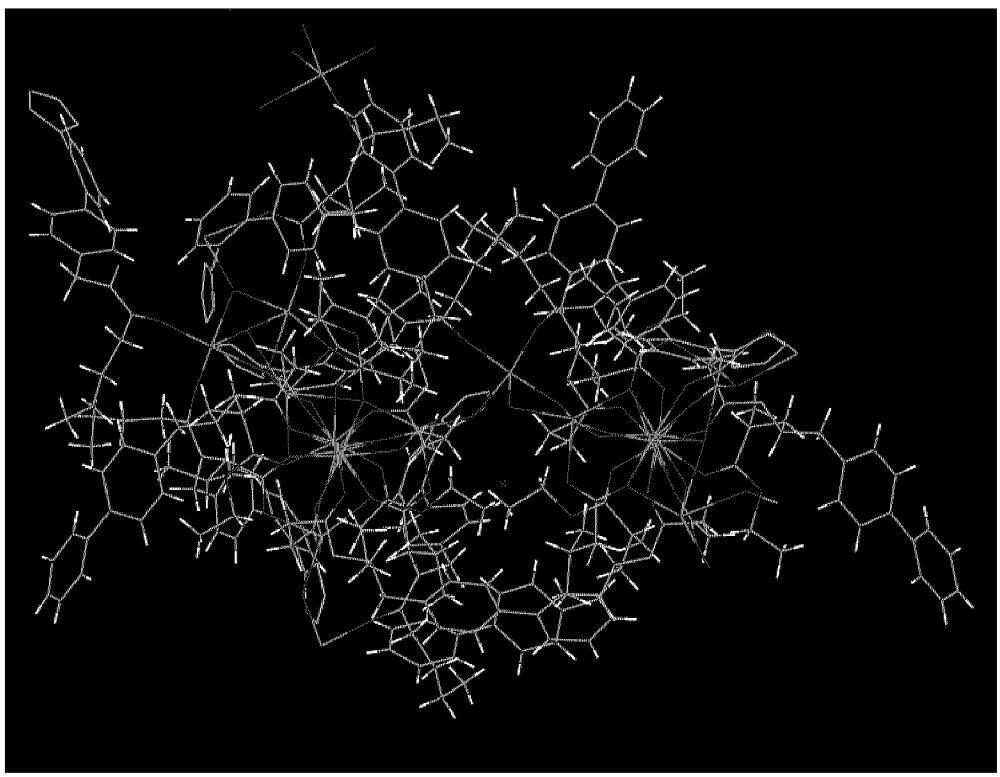
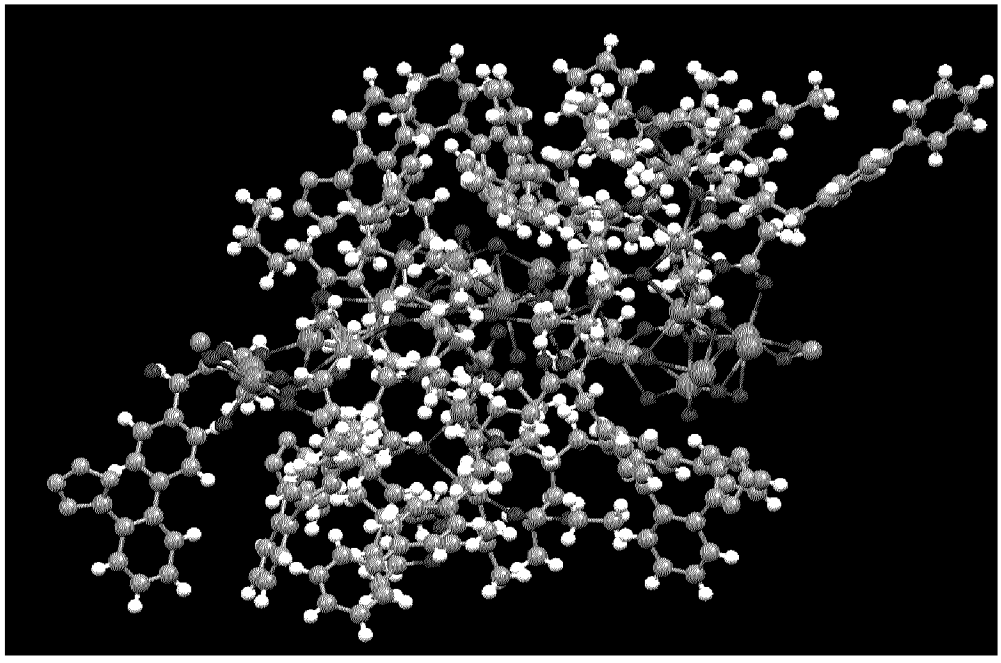


Figure 11-11 Wireframe representation of LCZ696 asymmetric unit



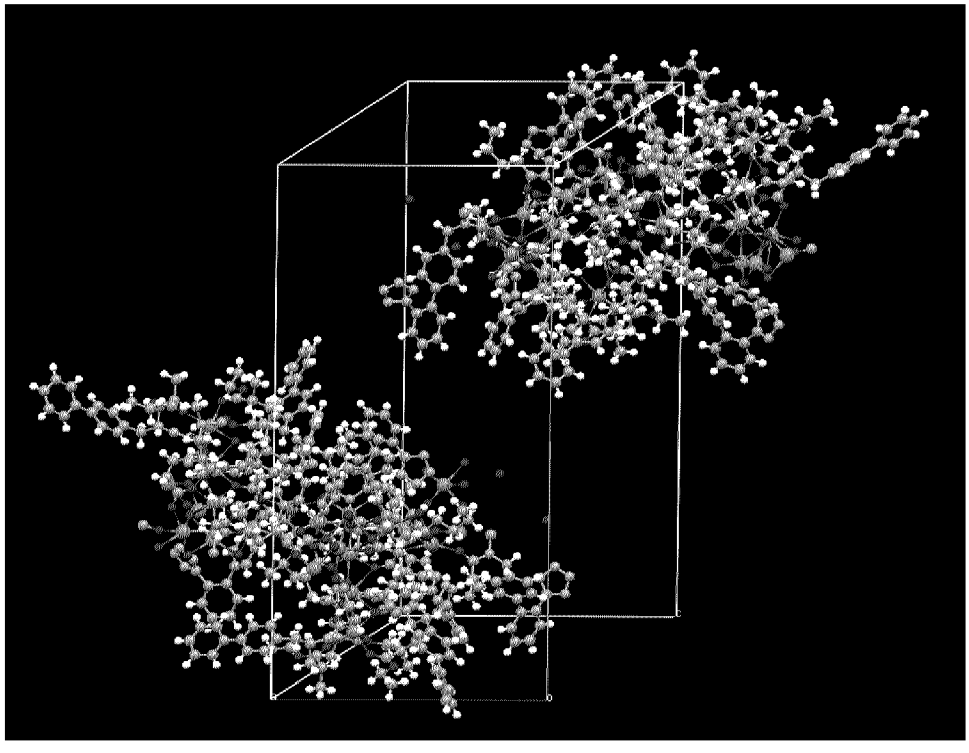
(grey = carbon; blue = nitrogen, red = oxygen; purple = sodium, white = hydrogen)

Figure 11-12 Ball-and-stick representation of LCZ696 asymmetric unit



(grey = carbon; blue = nitrogen, red = oxygen; purple = sodium, white = hydrogen)

Figure 11-13 Unit cell of LCZ696 with two asymmetric units



(grey = carbon; blue = nitrogen, red = oxygen; purple = sodium, white = hydrogen)

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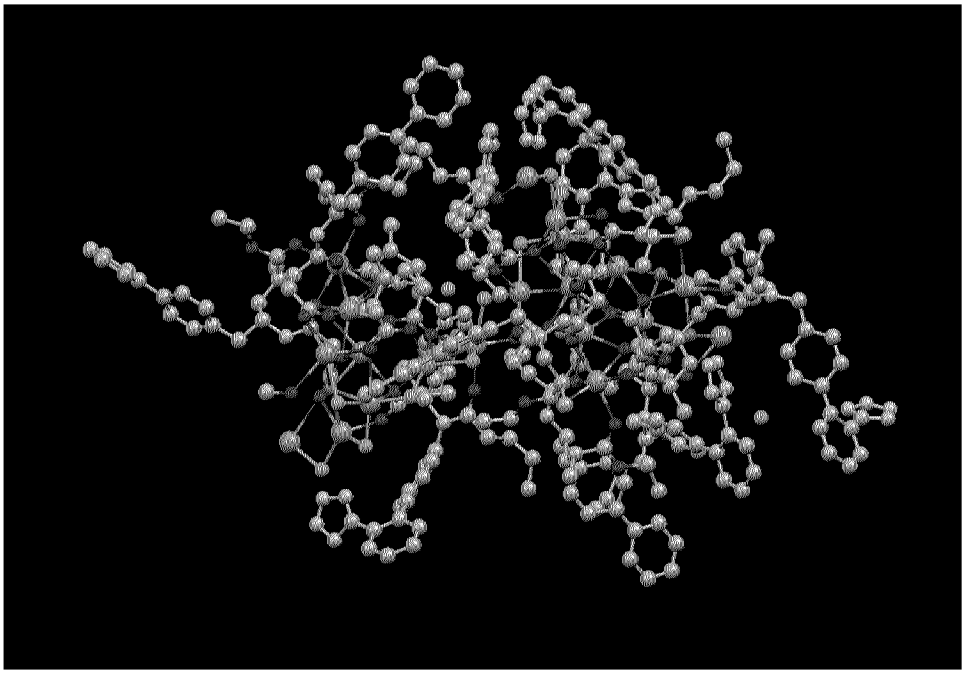
Figure 11-14 Asymmetric unit of LCZ696: positions of 15 water molecules (green)



(grey = carbon; blue = nitrogen, red = oxygen; purple = sodium)

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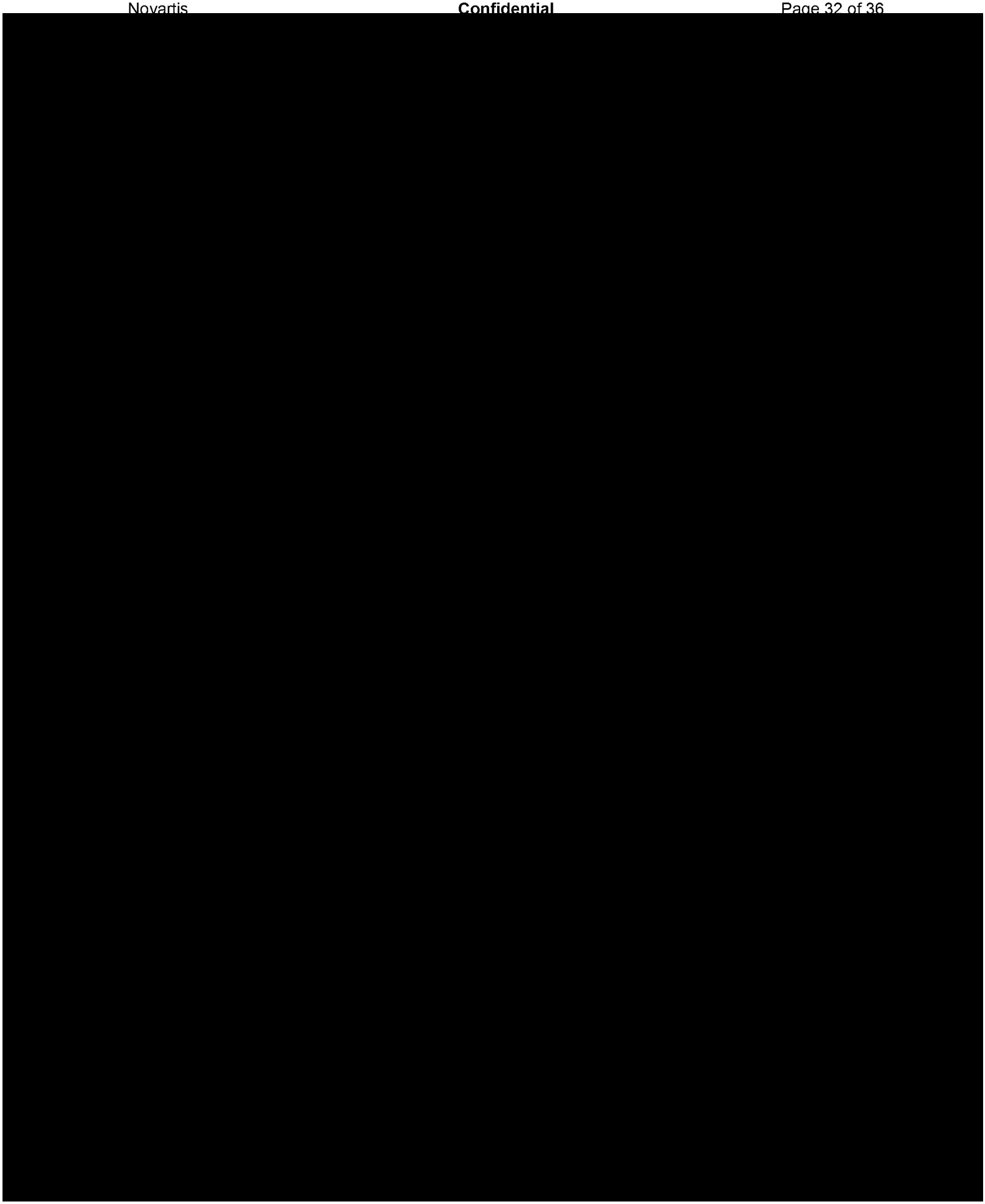

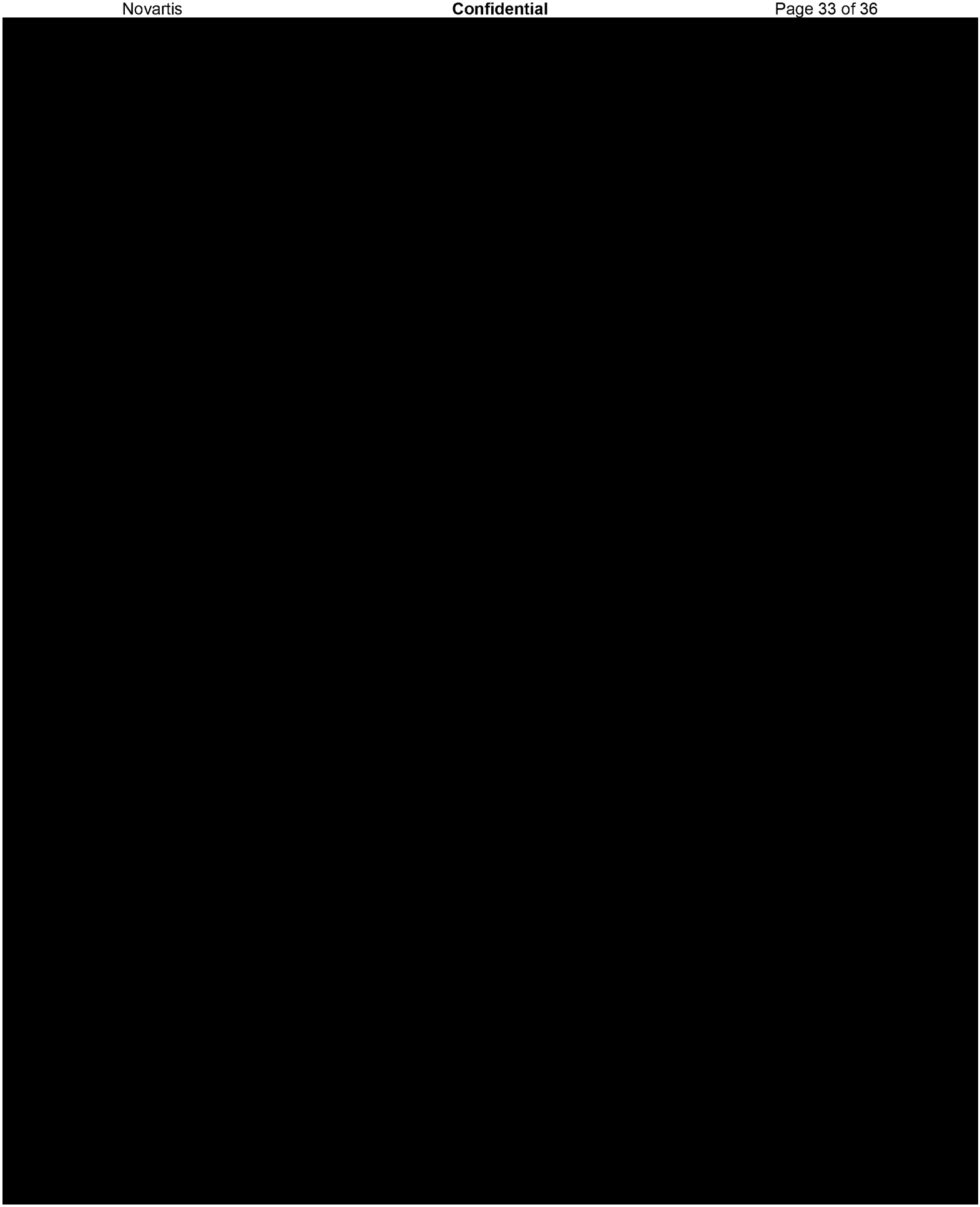

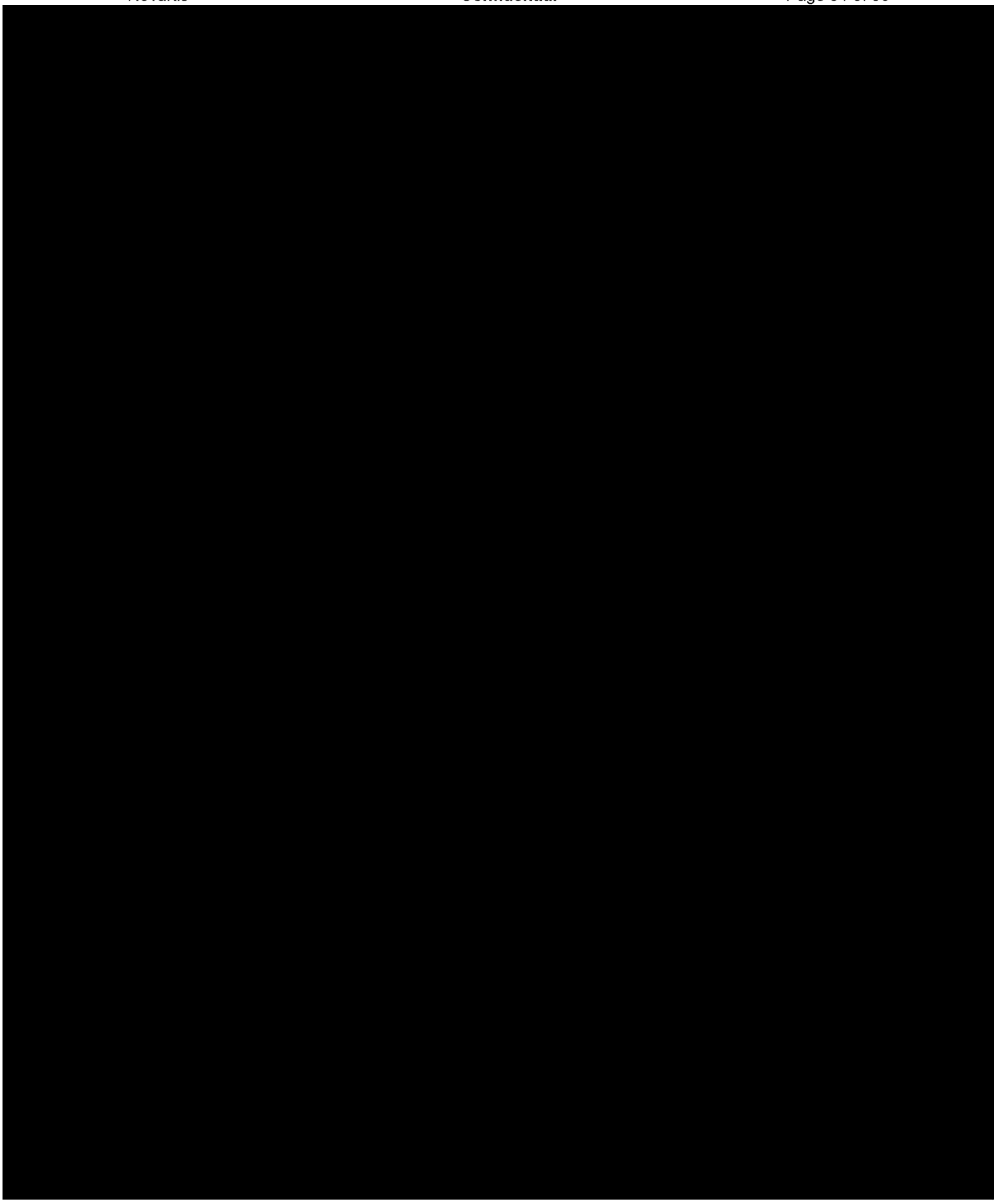

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The infrared absorption spectrum for LCZ696 obtained using Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) spectrometer (Nicolet Magna-IR 560) shows the following significant bands, expressed in reciprocal wave numbers (cm^{-1}):

2956 (w), 1711 (st), 1637 (st), 1597 (st), 1488 (w), 1459 (m), 1401 (st), 1357 (w), 1295 (m), 1266 (m), 1176 (w), 1085 (m), 1010 (w), 1942(w), 907 (w), 862 (w), 763 (st), 742 (m), 698 (m), 533 (st).

The error margin for all absorption bands of ATR-FTIR is ± 2 cm^{-1}.

The intensities of the absorption bands are indicated as follows: (w) = weak; (m) = medium; and (st) = strong intensity

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Raman spectrum of LCZ696 measured by a dispersive Raman spectrometer with 785 nm laser excitation source (Kaiser Optical Systems, Inc.) shows the following significant bands, expressed in reciprocal wave numbers (cm^{-1}):

3061 (m), 2930 (m, broad), 1612 (st), 1523 (m), 1461 (w), 1427 (w), 1287 (st), 1195 (w), 1108 (w), 1105 (w), 1041 (w), 1011 (w), 997 (m), 866(w), 850 (w), 822 (w), 808 (w), 735 (w), 715 (w), 669 (w), 643 (w), 631 (w), 618 (w), 602 (w), 557 (w), 522 (w), 453 (w), 410 (w), 328 (w).

The error margin for all Raman bands is ± 2 cm^{-1}.

The intensities of the absorption bands are indicated as follows: (w) = weak; (m) = medium; and (st) = strong intensity.

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